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Issued in the interest of corn-borer control conducted by the United States Department of Agriculture in cooperation with the State departments of agriculture and State agricultural colleges in New York, Pennsylvania, Ohio, Michigan, and Indiana.

BUREAU OF ENTOMOLOGY

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RECEIVED

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Washington, D. C.

June 16, 1928

\$ 1,257,580  
\$ FOR CORN BORER CONTROL

The failure of Congress to make the necessary appropriation to carry out the Purnell corn borer control act will not affect in any way the program of quarantine, control and research work of the Department of Agriculture for which \$1,257,580 was appropriated during the recent session of Congress.

The quarantine and control work will be carried on by a new unit in the Department of Agriculture, the Plant Quarantine and Control Administration. The appropriation makes \$887,660 available for this work.

The quarantine will be strictly enforced over the entire infested area including parts or all of 13 States.

To properly determine the quarantine area each year, very careful scouting is necessary. Over the entire border area and for several miles beyond the furthest discovery of borers, the scouts search for any trace of borers during the late summer and fall.

The Federal Government will cooperate with the States in cleaning up isolated infestations outside the general quarantine area and sections of especially heavy infestations in river valleys leading out of infested territory.



## PLANS FOR THE RESEARCH PROGRAM

REGULAR  
\$219,920

The appropriation Act provides \$219,920 for a complete study of the insect from every angle. These results will serve as a basis for future control either by direct means or through the agency of natural enemies. The work will be carried on at the corn-borer laboratories at Arlington, Mass., Silver Creek, N. Y., Sandusky, Ohio; Toledo, Ohio; and Monroe, Mich.

Investigations on parasites which will prey on corn borers are going ahead at the European laboratory located at Hyeres, France. As a result of this work, 335,000 parasites representing 12 different species have been sent to America from Europe. This year, a survey of corn-borer conditions throughout Central Europe will be completed. After preliminary investigation, the hunt for effective parasites in the Orient is being put on a definite working basis this year.

SPECIAL  
\$150,000

Special research for which \$150,000 has been provided will be carried on this year along the following lines:

- (1) Cultural and breeding investigations.
- (2) Substitute crops.
- (3) Effects of feeding substitutes to livestock.
- (4) Utilization of corncobs and stalks.
- (5) Study of insecticides.
- (6) Development of control machinery.
- (7) Necessary farm management adjustments.

## PROPOSED PROGRAM

## FOR CONTROL CAMPAIGN

## UNDER THE PURNELL ACT

To enable the Department of Agriculture to function under the act, in case Congress appropriates funds along the lines proposed in the resolution presented in the last Congress, it will be necessary for the States involved to issue regulations early enough for farmers in the control area to receive adequate warning not to sow small grains in fields containing cornstalks and stubble. The resolution stipulated that adequate regulations be promulgated by all the States involved and that assurance of the satisfactory enforcement of these regulations be given before the Department begins any work under the act.

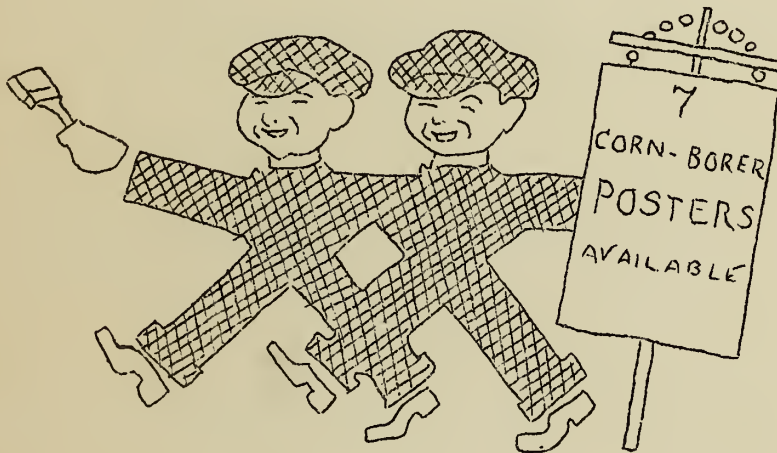
The first part of the paper is devoted to a discussion of the  
 various methods which have been proposed for the determination of  
 the rate of reaction between a radical and a molecule. The  
 most common of these is the method of initial rates, in which  
 the initial concentration of the radical is varied and the  
 initial rate of reaction is measured. This method is simple  
 and direct, but it is subject to a number of errors, and it  
 is often difficult to obtain accurate results. Another method  
 is the method of half-lives, in which the half-life of the  
 radical is measured. This method is also simple, but it is  
 subject to the same errors as the method of initial rates.  
 A third method is the method of steady-state concentrations,  
 in which the concentration of the radical is maintained at a  
 constant value by the addition of a suitable reagent. This  
 method is more complicated, but it is more accurate than  
 the other two. The fourth method is the method of  
 continuous flow, in which the radical and the molecule are  
 mixed in a flow tube, and the rate of reaction is measured  
 by the change in concentration of the radical as it flows  
 through the tube. This method is also more complicated, but  
 it is more accurate than the other three. The fifth method  
 is the method of laser light scattering, in which the  
 rate of reaction is measured by the change in the intensity  
 of the scattered light as the radical and the molecule are  
 mixed. This method is the most accurate of the five, but  
 it is also the most complicated.

The second part of the paper is devoted to a discussion of  
 the various factors which influence the rate of reaction between  
 a radical and a molecule. The most important of these are the  
 concentration of the radical, the concentration of the molecule,  
 the temperature, and the nature of the radical and the molecule.  
 The concentration of the radical influences the rate of  
 reaction in a direct proportion. The concentration of the  
 molecule influences the rate of reaction in a direct proportion.  
 The temperature influences the rate of reaction in a direct  
 proportion. The nature of the radical and the molecule  
 influences the rate of reaction in a direct proportion.

The third part of the paper is devoted to a discussion of  
 the various applications of the study of the rate of reaction  
 between a radical and a molecule. The most important of these  
 are the study of the mechanism of the reaction, the study of  
 the kinetics of the reaction, and the study of the thermodynamics  
 of the reaction. The study of the mechanism of the reaction  
 is important because it allows us to understand the steps  
 which lead to the formation of the products. The study of the  
 kinetics of the reaction is important because it allows us to  
 determine the rate of reaction. The study of the thermodynamics  
 of the reaction is important because it allows us to determine  
 the energy change which occurs during the reaction.



Under the program proposed by the department for the administration of the 1928 act, the control work would begin on the margin of the infested area nearest the great Corn Belt and extend back into the more heavily infested territory as far as funds would permit. The regulatory zone would include approximately 2,500,000 acres of corn land in Indiana, Michigan and Ohio, beginning with the furthest westward advance of the corn borer, as disclosed by the 1928 survey. The control area probably would include all of the borer advance discovered in 1928, the advance recorded in 1927, and some parts of the older infested territory in Ohio, Michigan, and Indiana.



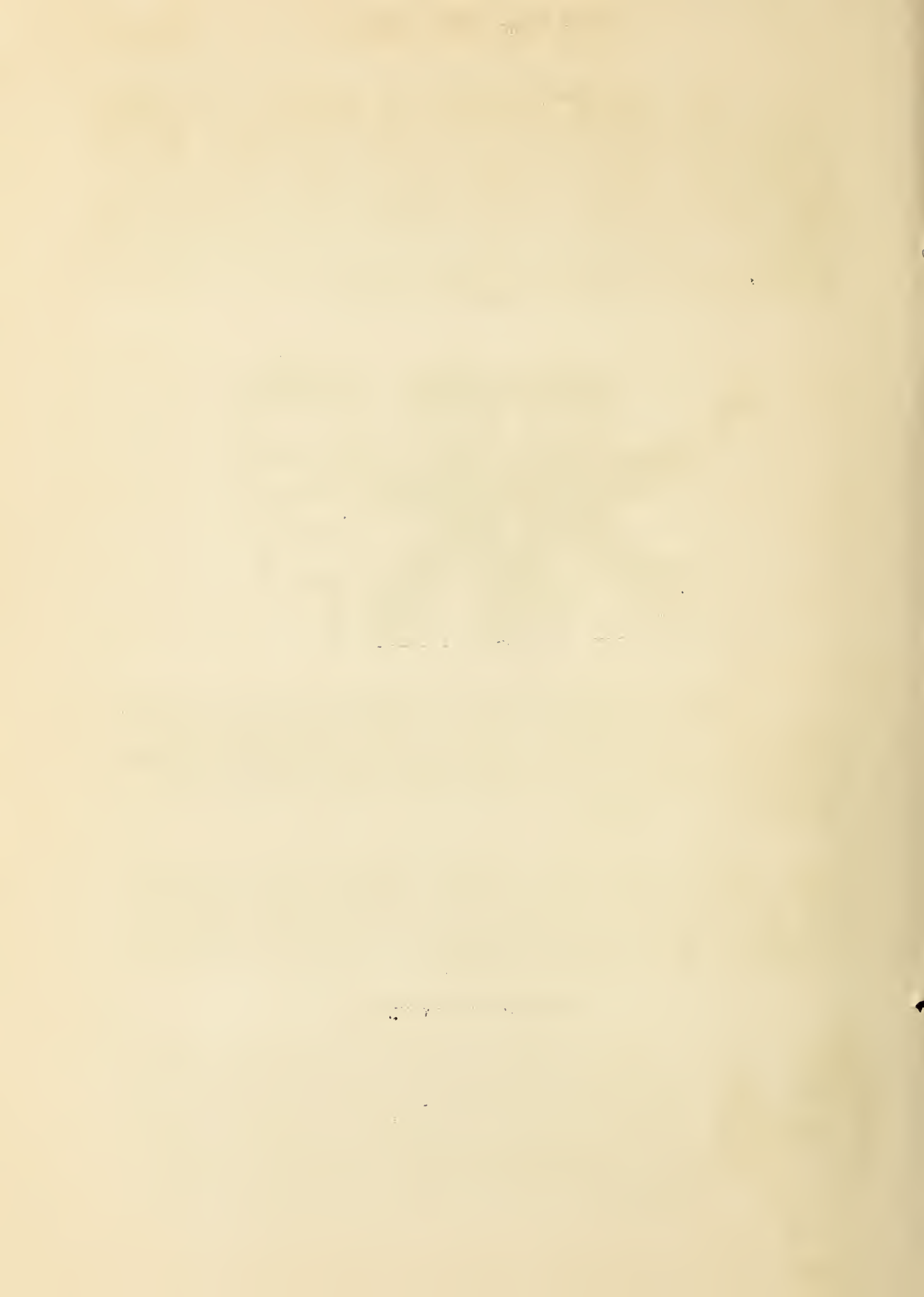
A series of seven posters illustrating corn borer control measures have been prepared by the corn borer information service and is now available. These posters are being distributed through the extension editors of the various States for display in banks, storerooms, offices and other places where they will come to the attention of the farmers.

Small reproductions of the posters are being sent to the county agents and agricultural teachers in each of the corn borer states with the request that they state the approximate number of sets they will need. The Posters are 18 by 24 inches and arranged in sequence. As the edition is small, it is desired to place each set where it can be used advantageously.

#### INTERESTING EXPERIMENTS

Some interesting experiments are being conducted in the storage of cornstalks, anticipating their commercial utilization. The stalks are stored under various conditions of exposure to temperature and moisture, under different farm conditions, and also baled, shredded and processed by various methods. The effect upon the corn-borer population is then observed.









"A Bibliography of the European Corn Borer," by J. S. Wade. Miscellaneous Circular No. 46, United States Department of Agriculture.

This is a revision and an enlargement of the bibliography compiled in 1925. It contains 914 references to articles on the corn borer listed alphabetically by author and includes practically all the literature that has appeared on this insect in both American and foreign publications.

There are 123 citations of foreign literature, 109 titles by research workers of the United States Government, 274 titles by State officials, 67 magazine articles, and references to 7 books. In the last three years 330 titles have been added to the bibliography.

#### A FEW ADDITIONAL REFERENCES

"About the European Corn Borer," by A. G. Ruggles and A. C. Army. Jersey Bulletin, December 28, 1927.

"Clean-up to Defeat the Corn Borer," by S. Heymann, Ohio Farmer, November 26, 1927.

"Study of corn improvement," by A. N. Hume, Dakota Farmer, December 1, 1927.

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